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the external incisor, which was first pointed out by Cope, and which has been observed independently by several others, is frequently observed in Europe as well as in America; second, that the loss of the first inferior incisor is also not very uncommon in Europe and that the final reduction of the inferior incisors, should it take place, will be by the loss of this tooth and not by that of the external incisor as in the superior series. He, therefore, believes that the ultimate formula of the incisive dentition in man will be $I\frac{1}{1}$, and not $I\frac{1}{2}$, as Cope left it.

ENTOMOLOGY.[1]

The Segmental Sclerites of Spirobolus.—The structure of the segments of Diplopoda has long been a morphological puzzle. On account of the possession of two pairs of legs they have in a general way been supposed to be double segments, that is, formed by the coalescence of two distinct embryonic or theoretical segments. Toward a morphological demonstration of this idea there has been little progress. Indeed, there are many facts which give grounds of suspicion as to its correctness. Among these may be noticed that the double footed state does not occur in the embryo at all, and that the segments which in the adult bear two pairs of legs either do not exist in the newly hatched larva or do not bear any legs at that stage, the newly hatched diplopod larva having but three pairs of legs, the posterior of which is attached to the fourth segment (at least in the Polydesmoidea). Moreover, all Diplopoda have apodous segments not differing otherwise from those which bear legs; also all Diplopoda have segments which bear but one pair of legs, and yet have not been found to be greatly different from the others. Growing Diplopoda acquire segments by intercalation in front of the last. The segment is added at one moult, the legs for it at the next. As the possession of two pairs of legs has been the occasion of the theories of duplex segments, these facts are the more relevant as objections, since more difficulties are introduced than are disposed of by the theories.

The existence of pluræ in the Oniscomorpha has long been known, and for a less period in the Colobognatha and Limacomorpha. In the other orders these elements of the segmental ring are so thoroughly coalesced or eliminated that their existence was theoretical until their discovory in Stemmatoiulus. In that form, however, the multiplicity of peculiar characters weakens the application of homologies to the other orders, unless these can be based on structural facts. It is thus a matter of interest that the existence of pleuræ in another Diplopod order can be affirmed.

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[1] Edited by Clarence M. Weed, New Hampshire College, Durham, N. H.

Some weeks since in examining large African Spirobolidæ I noticed what seemed to be traces of pleural sutures. On mentioning this fact to Mr. F. C. Straub who was studying with me, he called my attention to a specimen of *Spirobolus marginatus* Say which proved to be very remarkable. Possibly it was collected just after moulting, before the sclerites had become coalesced, or it may have been merely an individual anomaly. At any rate, it had on each side an obliquely longitudinal white line across each segment above the pedigerous lamina, indicating a pleural element about as broad as the lamina. That this is the pleural suture seems very probable, on theoretical grounds and more so that on the surface a special striæ followed the line of white.

What is more remarkable, this line was met above by two others which were transverse, dividing the segment into three subequal parts. These two lines extended completely over the animal, the space between them being somewhat greater above. There is also a median longitudinal suture, and a lateral just below the pore, thus dividing the dorsal portion of the ring into twelve subequal parts. The posterior of the transverse sutures follows the depression found in the segments of Spiroboli and usually called "the suture" in descriptions. The anterior line and the median line are indicated by minute differences in the sculpture, which would not have been noticed had not the white line drawn attention to them. It should be added that the lighter color was not due to anything inside or outside the segmental wall, but was in the wall itself and clearly indicated some structural difference. The phenomenon was exhibited by the anterior and middle segments of the body, becoming indistinct caudad. In all cases the pattern was the same; the whole series of lines could be made out on many segments, and there were no other similar lines or discolorations. The lines were not straight if examined under a microscope, even the median showing minute irregularities. Median sutures are known in four or five of the Diplopod orders and hence may reasonably be expected in all.

Had only the median line been marked as related, there would have been no hesitation in supposing that a median suture was indicated. Theoretical considerations only stand in the way of the reasonable presumption that the other exactly similar lines indicate sutures. If such an interpretation is allowed we are brought to the position that the segmental ring of Spirobolus consists of sixteen sclerites; twelve dorsal, two pleural and two ventral or pedigerous laminæ. It will be seen that only the last tend to indicate a transverse division of the segment, and in no Diplopod as yet has there been shown a transverse suture carried around the segment and dividing it into two parts. Only the legs and the parts necessarily connected with them, such as the pedigerous laminæ and nerve ganglia are duplicated. Even in the Oniscomorpha, Limacomorpha and Colobognatha where the pleuræ are most distinct, there is not the slightest indication that they were ever divided, and as they are the elements to which the pedigerous laminæ are next related, their evidence is more important than any drawn from the dorsal parts of the segment.

There is another way, however, in which a diplopodous animal might be developed from a monopodous ancestor. Alternate segments may have been suppressed, while the corresponding legs have been preserved. For such a supposition we have the analogy of the Chilopoda, where the pedigerous segments alternate with more or less rudimentary segments. In this case, however, the legs have been lost, that is, we must suppose so if we claim the analogy. Such a theory, while no more fantastic than the other, is probably no nearer the truth. After theoretical explanations have been exhausted we may, perhaps, learn that the double-footed condition is a peculiarity of this group of animals, not explainable by any general morphological considerations, but *sui generis,* after the manner of the branched segmental appendages of the Crustacea.—O. F. Cook.

Secretion of Potassium Hydroxide.—Mr. O. H. Lalter has some further notes[2] on the secretion of potassium hydroxide by *Dicranura vinula* and similar phenomena in other Lepidoptera. He finds that the imagines of eight species secrete from the mouth an alkaline fluid on emerging from the pupa. The three species of *Dicranura* wear what is called a shield, derived from the pupa case as they emerge, and they subsequently remove it by their legs. He finds that the strength of the solution in *D. vinula* is about 1.4 grm. of potassium hydroxide in every 100 ccm. of liquid. The mesenteron of the same species develops an anterior dorsal diverticulum for storage of the alkali during pupal life.—*Journal Royal Mic. Society.*

Lake Superior Coleoptera.—Mr. H. F. Wickham publishes[3] an admirable list of Coleoptera from the southern shore of Lake Superior. More than 200 species are enumerated in this list which have not before been credited to the region of the Lake. The collections were made at Bayfield, Wisconsin, during June and July.

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[2] Trans Ent. Soc. Lond., 1895, 399-312.

[3] Proc. Davenport Acad. Nat. Science, VII, 125–169.

The following introductory remarks are of sufficient general interest to be quoted at some length. The time for an accurate map of the faunal regions of the continent has not yet come—nor will it before another century at least of careful investigation has enabled us to fix approximately the range of the rarer forms of insect life. It is evident to any one who will read with care and with some understanding of the general principles of distribution, that many of the recent theories as to the division of our country into "life-zones" have very little foundation in fact. If better proof were wanting of this, we might point to that of authors changing from year to year their arbitrary arrangement of our zoö-geographical regions—uniting to-day two or three of those of older authors, and separating them again a few months later on. All this may or may not be progress, but it will all have to be gone over again in the light of a wider knowledge than seems to be at present in the possession of certain writers who cannot rest without having first shown us that all previously conceived ideas are totally wrong, and that their explanation of the distribution of life is the only plausible one. A single group of animals may or may not indicate in a general way the lines of distribution followed by a larger number—but it is manifestly unreasonable to hope for a stable method of division of a country into life-zones before the life of that country is well-known.

EMBRYOLOGY.[1]

The Effect of Lithiumchloride upon the Development of the Frog and Toad egg (R. fusca and Bufo vulgaris.)[2]—The results of the series of experiments performed in the histological laboratory at Münich with this salt seem of no little interest, and especially is this the case with the result obtained with a 0·5 per cent solution. In every instance the eggs were placed in the solutions (varying from 1 per cent to 0·2 per cent) between a half and an hour and a half after fertilization.

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[1] Edited by E. A. Andrews, Baltimore, Md., to whom abstracts reviews and preliminary notes may be sent.

[2] A. Gurwitsch, cand. med. Anat. Anz., XI, 65–70.